

Abstract:

We are developing focal plane arrays of bolometric detectors for sub-millimeter and millimeter-wave astrophysics. We propose a flexible array architecture using arrays of slot antennae coupled via low-loss superconducting Nb transmission line to microstrip filters and antenna-coupled bolometers. By combining imaging and filtering functions with transmission line, we are able to realize unique architectures such as a multi-band polarimeter and a planar, dispersive spectrometer. Micro-strip bolometers have significantly smaller active volume than standard detectors with extended absorbers, and can realize higher sensitivity and speed of response. The integrated array has natural immunity to stray infrared radiation or spectral leaks, and minimizes the suspended mass operating at 0.1 - 0.3 K. Calculations and performance of the slot antennae and filtering is presented in a parallel poster presentation. We discuss development of an instrument that realizes the planar spectrometer concept in waveguide. We also describe future space-borne spectroscopy and polarimetry applications.